

Claims

1. An isolated DNA comprising a nucleotide sequence coding for an enzyme having enone reductase activity wherein the enzyme is characterized by the following physico-chemical properties:
 - 5 (a) molecular mass: $61,300 \pm 5,000$ Da
(estimated using gel filtration, consisting of one subunit);
 - (b) co-factor: NADPH and NADH;
 - (c) substrate specificity: active on α,β -unsaturated ketons;
 - (d) optimum temperature: 55-60°C at pH 7.4; and
 - 10 (e) optimum pH: pH 4.5-8.5.
2. The isolated DNA according to claim 1, wherein said nucleotide sequence is selected from the group consisting of:
 - (a) a nucleotide sequence coding for a polypeptide having the amino acid sequence shown in SEQ ID NO:2;
 - 15 (b) a nucleotide sequence coding for an allelic variant of the polypeptide having the amino acid sequence shown in SEQ ID NO:2; and
 - (c) a nucleotide sequence coding for a polypeptide having the amino acid sequence shown in SEQ ID NO:2, in which one or more amino acids are added, inserted, deleted and/or substituted but having the enone reductase activity.
- 20 3. The isolated DNA according to claim 1, wherein said nucleotide sequence is selected from the group consisting of:
 - (a) a nucleotide sequence represented in SEQ ID NO:1;
 - (b) a nucleotide sequence encoding an enone reductase having the amino acid sequence encoded by the nucleotide sequence shown in SEQ ID NO:1;
 - 25 (c) a nucleotide sequence which hybridizes to the complement of the nucleotide sequence of (a) or (b) under stringent hybridizing conditions; and
 - (d) a nucleotide sequence which is at least 80% identical to the nucleotide sequence of (a).
4. A vector or a plasmid comprising the DNA of claim 1.
5. A host cell transformed or transfected by the DNA of claim 1 or the vector or the
30 plasmid of claim 4.
6. A polypeptide encoded by the DNA of claim 1.

7. A process for the production of levodione, which comprises contacting ketoisophorone with the polypeptide of claim 6 under conditions suitable for the production of levodione, e.g. at pH values of from 4.5 to 8.5 and at a temperature range from 10 to 60 °C for 5 minutes to 72 hours, or at pH values of from 5.0 to 8.0 and at a temperature range from 20 to 60 °C for 15 minutes to 48 hours.
8. A process for the production of levodione, which comprises contacting ketoisophorone with the host cell of claim 5 or a cell-free extract thereof under the conditions suitable for the production of levodione, e.g. at pH values of from 4.0 to 9.0 and at a temperature range from 10 to 60 °C for 15 minutes to 72 hours, or at pH values of from 5.0 to 8.0 and at a temperature range from 20 to 60 °C for 30 minutes to 48 hours.